REMARKS

Favorable and prompt allowance of the pending claims in the application is respectfully requested on the basis of the following particulars.

1. In the specification

The specification is amended to particularly state that the facing layer 12 includes a plurality of apertures 34 that are preformed in a "straight manner through the thickness of the facing layer" and in a pattern prior to securing the facing layer 12 to the absorbent core 14. Clear support for this language is found at least in Figs. 2 and 6-9 depicting the wound dressing embodiments, and support is further described in connection with the method for forming the apertures, as depicted by at least the perforating elements 44 in the perforation device 42 of FIGS. 19 and 20.

The specification is also amended to particularly state that the plurality of apertures are arranged in a predetermined, "grid-like pattern." Particular support for this language is provided in at least FIGS. 10, 12, 14 and 15 in connection to the wound dressing embodiments, and again support is further described in connection with the method for forming the apertures, as depicted by at least the perforating elements 44 in the perforation device 42 of FIGS. 19 and 20.

These amendments to the specification find clear support in the application, as originally filed, as it is sufficiently shown throughout the drawings that the "straight manner" of the apertures extending through the facing layer, and the "grid-like" pattern of the pattern was well within the scope of the invention. Accordingly, no new matter is introduced into the application by way of the amendment to the specification.

Should the examiner refuse to enter the current amendment to the specification on grounds that the amendment introduces new matter, the applicant respectfully requests the examiner to explain in detail on the record how these drawings do not show that which has been described in the amendment to the specification.

Entry of the amendment to the specification is kindly requested.

2. In the claims

In the AMENDMENT TO THE CLAIMS, independent claim 12 is amended to recite that both the first and second facing layers are "hydrophobic," and that they are each discrete layers of a silicone compound. Further, claim 12 is amended to include the subject matter of claim 19.

There is clear support in the specification for the language of the facing layer being "hydrophobic" in at least the paragraph on page 20, lines 12-26, further the skilled person would recognize a silicone gel as being "hydrophobic."

There is specific support in the specification to indicate that the first and second facing layers are discrete layers of a silicone compound in at least page 26, line 12 through page 27, line 23.

The pattern of the apertures is particularly defined as being in a "predetermined" grid-like pattern. Original support for the term "predetermined" when describing the pattern is found on page 10, in the paragraph beginning on line 4.

Claim 12 is also amended to recite that in a 90° peel-off test from a stainless steel surface, the tackiness of the first facing layer is within the range of 0.5 N to 5.0 N, and the second facing layer is within the range of 0.05 N – 1.0 N. Full support for this language is found in the specification at page 27, lines 8-13.

In view of the amendment to claim 12, claims 16 and 19 are cancelled without prejudice or disclaimer.

Claims 24-28 are cancelled to expedite the prosecution of this application, and such cancellation is without prejudice or disclaimer.

The applicant reserves all rights to the non-elected subject matter.

New claim 29 recites a wound dressing according to claim 12, wherein the first facing layer is devoid of apertures and prevents moisture transfer through the border section of the backing layer. Clear support for this language is found in the specification at page 22, lines 18-20.

New claim 30 recites a wound dressing according to claim 12, wherein the apertures of the second facing layer extend in a straight manner through the thickness

of the second facing layer. Support for this language is found in originally-filed FIGS. 2 and 5-9 with regard to a wound dressing, and originally-filed FIGS. 19 and 20 with regard to one of the processes for forming the apertures. The specification has been amended to expressly indicate that the apertures extend straight through the thickness of the facing layer.

It is submitted that there is clear support in the specification for all of the current amendment to the claims, and thus no new matter is introduced by the amendment.

Entry of the amendment to the claims is respectfully requested in the next Office communication.

3. Rejection of claims 12, 14-16, 18-20 and 24-28 under 35 U.S.C. § 112, first paragraph

Reconsideration of this rejection is kindly requested in view of the following observations.

As is readily evident from the drawings, there is full support for the language in claim 12 specifying that the plurality of apertures are arranged in a "grid-like pattern." Support for this language is shown in at least FIGS. 10, 12, 14 and 15 in connection to the wound dressing, and again support is further described in connection with the method for forming the apertures, as depicted by at least the perforating elements 44 in the perforation device 42 of FIGS. 19 and 20.

As noted above, the specification has been amended to specify that the apertures in the facing layer are arranged in a predetermined "grid-like" manner.

It is submitted that the skilled person would recognize from the originally-filed drawings that the apertures in the facing layer are arranged in a predetermined, grid-like pattern.

It will be noted that the language directed to the non-apertured sections of the second facing layer consist of gel has been removed from claim 12. Nonetheless, the applicant submits that there is both express and inherent support in the written description that the non-apertured sections of the second facing layer consist of gel.

Specifically, the specification indicates that the facing layer is a cross-linked silicone elastomer gel (page 20, lines 14-18).

The specification at page 24, line 21 through page 25, line 22, explains one of the exemplary methods for forming the facing layers formed by a silicone gel compound. There is no indication of including any ingredient other than silicone gel, and instead the specification clearly describes forming the silicone gel compound solely on silicone ingredients.

The skilled person would recognize from this description that that facing layers may "consist" of the silicone gel compound and therefore include nothing more.

The rejection is misplaced in stating that the silicone gel must include a skin treatment agent. The specification merely indicates that including skin treatment agents is optional and not mandatory. In particular, the specification notes that the facing layer may include one or more skin treatment agents (page 21, lines 25-27).

Accordingly, it is clear that the specification does not require that the facing layer be formed from a silicone gel compound to include a skin treatment agent, and it is readily apparent that the specification indicates that the facing layer may consist solely a silicone gel compound. It follows that it is well within the scope of the specification that the non-apertured regions of the facing layer can "consist" a silicone gel compound.

In view of these observations, withdrawal of the rejection of the claims under 35 U.S.C. § 112, first paragraph is respectfully requested.

4. Rejection of claims 12, 14-16, 18, 20, 24 and 26-28 under 35 U.S.C. § 103(a) as being unpatentable over GB patent 2061732 (*Steer*) in view of any one of U.S. patent 5,636,643 (*Argenta*), U.S. patent application publication 2002/0161346 (*Lockwood*) and U.S. patent 6,458,109 (*Henley*), and further in view of U.S. patent application publication 2002/0156410 (*Lawry*)

Reconsideration of the rejection of the claims is courteously requested in view of the amendment to the claims and the following remarks.

Steer does not disclose first and second facing layers which are both skin adherent and hydrophobic.

There is no mention that the facing layer located on the layer E, the portion of which extends past the layer B, is both skin adherent and hydrophobic. Moreover, neither *Steer* nor *Lawry* explains that a first facing layer is formed by a silicone compound.

As for the layer B and its various iterations described by *Steer*, it is clear that whatever layer which is placed adjacent to the wearer's skin, i.e., proximal side of the dressing, *Steer* particularly requires that the layer B is "absorbent." Providing an absorbent layer is in contravention to the express requirement of the second facing layer according to claim 12. It is therefore apparent that *Steer* teaches away from the combination required by claim 12, and the skilled person would have been deterred from arriving at the wound dressing of claim 12 from the teachings of claim 12.

While the rejection surmises that it would be obvious to replace the layer B in *Steer* with the hydrophobic gel of *Lawry*, the rejection ignores the basic teachings of *Steer* which mandates that the layer B is both curative and absorbent. *Steer* teaches that the layer B is a hydrocolloid, and the skilled person would readily recognize that hydrocolloids absorb liquid and form a gel.

The applicant provides herewith a document which provides a basic description of hydrocolloid wound dressings entitled "Frequently Asked Questions: Hydrocolloid Dressings."

The combination of *Steer* and *Lawry* is a post-hoc determination in contravention to the basic purpose of the wound dressing of *Steer*. If the hydrocolloid

layer B were removed from the dressing of *Steer*, it would no longer provide the curative and absorbent material which it expressly requires to contact a wound (p. 1, ll. 13-17). The replacement of layer B with the hydrophobic gel of *Lawry* would therefore destroy the purpose of *Steer* since the layer B could not provide any absorbent means.

The examiner is reminded that the second facing layer in claim 12 is a hydrophobic silicone compound, and is adjacent and underlies the absorbent core. It is this second facing layer which is principally in contact with any wound.

The rejection discusses that the skilled person would replace the absorbent layer of *Steer* with the hydrophobic layer of *Lawry* so it will not break down due to sweat. The rejection misses the point of the wound dressing of *Steer* which is to absorb wound fluid and matter exuded from ulcerous wounds. Sweat is not a concern. As the skilled person would appreciate, an ulcerous wound may exude quantities of wound fluid and matter, and little or no sweat is produced by the open wound itself.

If any sweat is produced, it is likely at areas of the skin surrounding the wound, which in the wound dressing of claim 12 corresponds to the first facing layer.

The applicant respectfully requests the examiner to explain how sweat would cause the layer B in *Steer* to breakdown. Such a position is misplaced in view of an understanding of hydrocolloids. Indeed, as explained in the attached document on hydrocolloids, hydrocolloids are clearly capable of retaining form as they begin to gel upon absorbing fluid. In fact, *Steer* includes a viscous binder in the hydrocolloid so that it can both absorb fluid and remain intact when placed over an open wound (p. 1, ll. 64-79).

It will be noted that while *Steer* indicates that a silicone rubber may be includes in the layer B, the silicone rubber is merely provided as a viscous binder (p. 1, ll. 64-79). In other words, it does not render the layer B hydrophobic, but instead is provided as a binder to keep the hydrocolloid intact as it swells due to absorption of wound fluid and matter.

Therefore, the applicant kindly asks the examiner to explain how if there is fear that the layer B will breakdown due to the absorption of sweat, why can the hydrocolloid layer B be able to absorb wound fluid from an ulcerous wound and still remain intact?

If the examiner maintains the stated rationale in the rejection with regard to why the skilled person would replace the absorbent layer B of *Steer* with the hydrophobic layer of *Lawry*, the applicant respectfully requests the examiner to provide some evidence as to how sweat would breakdown a hydrocolloid in a wound dressing, and the skilled person would necessarily seek to remove such hydrocolloid layer with a hydrophobic layer.

From these observations on the combined teachings of *Steer* and *Lawry*, it is submitted that the teachings of the documents contradict one another with regard to the facing layer adjacent and proximal to a wound, the skilled person would not recognize to combine these references due to these contradictory teachings, and the reasons for combining these documents are misplaced in view of an understanding of hydrocolloids and the purpose of the wound dressing of *Steer*.

Claim 12 is also now amended to describe both the first and second facing layers are formed from a silicone gel compound, and that the tackiness of each of these facing layers is different from one another. Nowhere is such an understanding found in either *Steer* or *Lawry*. Moreover, neither *Steer* nor *Lawry* teach the particular range of tackiness of first and second facing layers, and their particular relationship to each other and the backing layer and absorbent core of the wound dressing of claim 12.

The teachings of *Argenta*, *Lockwood* and *Henley* fail to make up for the above-noted shortcomings on the combined teachings of *Steer* and *Lawry*.

Accordingly, claim 12 is considered patentable over the combination of *Steer*, *Lawry*, *Argenta*, *Lockwood* and *Henley*.

The claims dependent from claim 12 are thus patentable over these combined references based on their dependency from claim 12, and their individually recited features.

Withdrawal of this rejection is courteously requested.

5. Conclusion

As a result of the amendment to the claims, and further in view of the foregoing remarks, it is respectfully submitted that the application is in condition for allowance. Accordingly, it is respectfully requested that every pending claim in the present application be allowed and the application be passed to issue.

If any issues remain that may be resolved by a telephone or facsimile communication with the applicants' attorney, the examiner is invited to contact the undersigned at the numbers shown below.

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World Wide Wounds

Frequently Asked Questions: Hydrocolloid Dressings

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Introduction

Hydrocolloids are among the most widely used modern dressings; but that does not necessarily mean that they are widely understood.

This article aims to provide answers to many of the questions that users might ask. It is *not* intended to be the final word; rather the opposite. These answers are written to be a starting point and no more. Like every article in *World Wide Wounds*, it can be amended or extended following readers' suggestions and additions.

What are hydrocolloid dressings?

Hydrocolloids are a type of dressing containing gel-forming agents, such as sodium carboxymethylcellulose (NaCMC) and gelatin. In many products, these are combined with elastomers and adhesives and applied to a carrier - usually polyurethane foam or film, to form an absorbent, self adhesive, waterproof wafer.

In the presence of wound exudate, hydrocolloids absorb liquid and form a gel, the properties of which are determined by the nature of the formulation. Some dressings form a cohesive gel, which is largely contained within the adhesive matrix; others form more mobile, less viscous gels which are not retained within the dressing structure.

In the intact state most hydrocolloids are impermeable to water vapour, but as the gelling process takes place, the dressing becomes progressively more permeable. The loss of water through the dressing in this way enhances the ability of the product to cope with exudate production [1].

One feature of hydrocolloids that is appreciated by clinicians is wet tack; unlike most dressings, they can adhere to a moist site as well as a dry one.

Reference 1: Thomas S., Loveless, P. A comparative study of the properties of twelve

hydrocolloid dressings. World Wide Wounds, July 1997; [Full Text: http://www.smtl.co.uk /World-Wide-Wounds/1997/july/Thomas-Hydronet/hydronet.html]

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What are the main indications for hydrocolloid dressings?

Hydrocolloids are easy to use, require changing only every 3-5 days, and do not cause trauma on removal. This makes them useful for clean, granulating, superficial wounds, with low to medium exudate.

Hydrocolloids provide effective occlusion; with dry wounds, they can have a softening effect, and they have been used to prevent the spread of MRSA (by providing a physical occlusive barrier).

Reference: Thomas, S., Hydrocolloids Journal of Wound Care 1992:1;2, 27-30

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Are there any side effects of hydrocolloid dressings?

Contact dermatitis

Hydrocolloid wound dressings have been in use for some 20 years, and have rarely been associated with allergic contact dermatitis. However, some hydrocolloid dressings contain the pentaerythritol ester of hydrogenated rosin as a tackifying agent, and this substance retains the sensitizing potential of colophony.

Reference: Sasseville D, Tennstedt D, Lachapelle JM: Allergic contact dermatitis from hydrocolloid dressings. Am J Contact Dermat 1997 Dec;8(4):236-238

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How much fluid can hydrocolloid dressings absorb?

The ability of hydrocolloids to absorb fluids varies considerably over time, and between products. Laboratory studies [1] suggest that the dressings may not be suitable for medium to high exuding wounds. Other research [2] suggested that when properly applied, the dressings might reduce the amount of exudate.

Reference 1: Thomas S., Loveless, P. A comparative study of the properties of twelve hydrocolloid dressings. World Wide Wounds, July 1997; [Full Text: http://www.smtl.co.uk /World-Wide-Wounds/1997/july/Thomas-Hydronet/hydronet.html]

Reference 2: Thomas S., Fear M., Humphreys J., Disley L., Waring MJ. The effect of dressings on the production of exudate from venous leg ulcers. WOUNDS 1996;8(5):145-150

What is the role of hydrocolloid dressings in maggot therapy?

Despite decades of experience in Maggot therapy, selecting appropriate dressing materials continues to be a problem. The dressing has to (1) prevent the maggots from escaping, (2) permit oxygen to reach the maggots, (3) facilitate drainage, (4) allow inspection of the wound, (5) require minimal maintenance, and (6) be of low cost.

One centre developed a two-layered cagelike dressing, the bottom layer of which comprised a hydrocolloid pad, applied to the surrounding healthy skin and covered by a fine chiffon or nylon mesh. Liquefied necrotic tissue drained through the mesh and was absorbed in a top layer of gauze, which was replaced periodically. Thus it was possible to contain the maggots within the wound by means of readily available materials.

Reference: Sherman R. A., A new dressing design for use with maggot therapy. Plast Reconstr Surg 1997 Aug;100(2):451-456

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What is the role of hydrocolloids in hypertrophic scars and keloids?

Silicone gel sheeting has been investigated for use in the treatments of keloids and hypertrophic scars. Its mechanism of action may be related to scar hydration. One randomized controlled prospective study set out to evaluate a hydrocolloid occlusive dressing that also acts by promoting a moist environment. Scar size and volume, color, patient symptoms, and transcutaneous oxygen measurements were taken.

The study found significantly reduced itching, reduced pain and increased pliability for both treatments, used over two months. The authors concluded that hydration of the scar offered symptomatic improvement, but no change in physical parameters.

Reference: Phillips T. J., Gerstein A. D., Lordan V., A randomized controlled trial of hydrocolloid dressing in the treatment of hypertrophic scars and keloids. Dermatol Surg 1996 Sep;22(9):775-778

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Have hydrocolloids been rendered obsolete by newer dressing types?

Over recent years, many new dressings have appeared on the market, but few new dressing types. The continuing success of hydrocolloids depends largely on their effectiveness as occlusive dressings. Any new dressing has to match or better their performance and/or compete on price. Currently, manufacturers of polyurethane foam dressings are promoting them as an alternative to hydrocolloids.

Few studies compare hydrocolloids with newer dressing types. In one randomised controlled clinical study involving 100 patients with leg ulcers and 99 patients with pressure sores in the community, a 'hydropolymer' dressing and a hydrocolloid dressing were compared. Statistically significant differences in favour of the hydropolymer dressing were detected for dressing leakage and odour production, but no statistically significant differences were recorded in the number of patients with either leg ulcers or pressure sores who healed in each treatment group.

The future may see hydrocolloids used more selectively, but they are by no means obsolete.

Reference: Thomas S., Banks V., Bale S., *et al.* A comparison of two dressings in the management of chronic wounds. J Wound Care 1997 Sep;6(8):383-386

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Are hydrocolloid dressings cost effective?

Studies too numerous to cite have established that hydrocolloid dressings are more effective than 'traditional' dressings, such as parafin gauze, dry gauze and saline soaks. Despite this, and the relative reduction in cost over the decades, many health professionals continue to use obsolete materials and methods.

When the efficacy of hydrocolloid occlusive dressing technique is compared with conventional wet-to-dry gauze dressing technique, the patient has been shown to benefit with a greater chance of healing, faster healing times, and less pain.

Nursing time is very significantly reduced, because the wound does not need dressing so often (or for so long) dressing time is markedly reduced. Costs are saved in materials alone, before even considering the cost of professional time [1]

Similar results have been found in patients with leg ulcers [2]

Reference 1: Kim Y.C., Shin J.C., Park C.I., *et al.* Efficacy of hydrocolloid occlusive dressing technique in decubitus ulcer treatment: a comparative study. Yonsei Med J 1996 Jun;37(3):181-185

Reference 2: Ohlsson P., Larsson K., Lindholm C., Moller M.A Comparison of saline-gauze and hydrocolloid treatment in a prospective, randomized study. Scand J Prim Health Care 1994 Dec;12(4):295-299

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Do hydrocolloid dressings reduce pain?

Pain is a feature of superficial wounds, such as skin graft donor sites, particularly at dressing changes.

One prospective randomized trial compared parafin gauze and a hydrocolloid dressing, applied on donor sites. The results showed that the hydrocolloid is a less painful dressing than parafin gauze, as well as achieving faster healing of skin graft donor sites [1].

In another study, which involved patients with lacerations, abrasions and minor operation incisions, compared a hydrocolloid dressing with a non-adherent dressing. While time to heal was similar for both groups, patients using the hydrocolloid experienced less pain, required less analgesia and were able to carry out their normal daily activities including bathing or showering without affecting the dressing or the wound. [2]

The precise mechanism involved in the hydrocolloid ability to reduce pain is not fully understood, but some possible explanations have been discussed. [3]

Reference 1: Cadier M. A., Clarke J. A. Dermasorb versus Jelonet in patients with burns skin graft donor sites. J Burn Care Rehabil 1996 May;17(3):246-251

Reference 2: Heffernan A., Martin A. J. A comparison of a modified form of Granuflex (Granuflex Extra Thin) and a conventional dressing in the management of lacerations, abrasions and minor operation wounds in an accident and emergency department. J Accid Emerg Med 1994 Dec;11(4):227-230

Reference 3: Nemeth AJ, Eaglstein WH, Taylor JR, et al. Faster healing and less pain in skin biopsy sites treated with an occlusive dressing. Archives of Dermatology, Vol 127, November 1991, pp 1679- 1683.

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Is there any difference between brands?

Yes

There are many diffences in structure, flexibility, dimensions, fluid handling properties and, probably, in other performance parameters. The trouble is, few studies have compared different brands [1]. Because of the shortage of *in vitro* research, and a complete lack of (published) *in vivo* research, manufacturers claims tend to be based on indirect comparisons such as comparisons based on rival studies which compared hydrocolloids and parafin gauze. One or two comparisons of 'patient satisfaction' have been published, but these have no clinical value. Or indeed any value at all, other than 'marketing exercises'.

Reference 1 Thomas S., Loveless, P. A comparative study of the properties of twelve hydrocolloid dressings. World Wide Wounds, July 1997; [Full Text: http://www.smtl.co.uk /World-Wide-Wounds/1997/july/Thomas-Hydronet/hydronet.html]

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Is colour duplex imaging possible through hydrocolloid dressings?

Colour flow duplex scanning is an accepted method of determining the patency and haemodynamic status in infrainguinal grafts and native arteries. There are often dressings covering the leg above the vessel to be scanned.

A blinded study compared scanning normal superficial femoral arteries with scans when one of five commonly used dressings were applied to the skin above the artery, in random order. The blinded operator graded the signal produced on a linear analogue scale.

An absorbent material dressing and a bilaminate membrane dressing did not transmit ultra-sound at all. Two thin membrane dressings allowed excellent B-mode and colour flow images, in addition to clear Doppler signals. A thin hydrocolloid allowed a clear B-mode image of each artery to be visualised and an adequate Doppler waveform to be obtained. However colour flow mapping was less than optimal although it was possible in each of the arteries.

In patients who require dressings and who may require colour flow duplex scanning of vessels in the same area, a product that permits ultrasound transmission, thus saving the necessity of removing the dressing for the assessment, clearly has advantages

Reference: Whiteley M. S., Magee T. R., Harris R., Horrocks M., Eur J Vasc Surg 1993 Nov;7(6):713-716

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How effective are hydrocolloid dressings for partial thickness burns?

A study compared a hydrocolloid formulation with silver sulphadiazine/chlorhexidine parafin gauze dressings in the outpatient management of small partial skin thickness burns.

Burn wounds were followed until complete re-epithelialization occurred. There were no statistical differences between the groups, with respect to healing time, and patients' subjective responses to treatment.

However, dressing application (but not removal) was easier in the hydrocolloid group. Furthermore, the that group had significantly fewer dressing changes; a mean of three changes per subject group compared with eight in the silver sulphadiazine/chlorhexidine parafin gauze group. In this study, both modalities were found to be equally suitable and effective for small partial skin thickness burns.

Reference: Afilalo M., Dankoff J., Guttman A., Lloyd J., DuoDERM hydroactive dressing versus silver sulphadiazine/Bactigras in the emergency treatment of partial skin thickness burns. Burns 1992 Aug;18(4):313-316

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Are hydrocolloid dressings contraindicated in diabetes?

An open randomized controlled study was carried out in 44 patients with diabetes who had necrotic foot ulcers treated with adhesive zinc oxide tape or with an adhesive occlusive hydrocolloid dressing. Fourteen of the 21 patients treated with adhesive zinc oxide tape had their necrotic ulcers improved by at least 50%, compared to six out of 21 with the hydrocolloid dressing (statistically significant). Fifteen patients showed an increase in the area of necrosis during the course of the 5-week study and of these, 10 had been treated with the hydrocolloid dressing. [1]

However, these wounds were necrotic; other clinicians firmly recommend hydrocolloids, particularly for the protection of the wound after the removal of necrotic tissue. [2]

Foot ulcers in people with diabetes, often homogenised by the term diabetic ulcer, usually have both vascular and neuropathic aetiology; it would be unwise to assume that two apparently similar ulcers should be managed the same way. This issue has been controversial since the introduction of hydrocolloids; currently, the best advice would seem

to be "use with caution in patients with diabetes."

Reference 1: Apelqvist J., Larsson J., Stenstrom A., Topical treatment of necrotic foot ulcers in diabetic patients: a comparative trial of DuoDerm and MeZinc. Br J Dermatol 1990 Dec;123(6):787-792 [PubMed abstract]
Reference 2: Laing P., Diabetic foot ulcers. Am J Surg 1994 Jan;167(1A):31S-36S [PubMed abstract]

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What are the effects of a hydrocolloid dressing on bacterial growth?

Thirty patients with lower limb ulcers of different aetiologies were treated with an occlusive hydrocolloid dressing twice a week for a maximum period of 12 weeks. No antibacterial chemotherapy was utilized. A culture was taken of the exudate of the ulcer before commencement of treatment and weekly or bi-weekly thereafter.

The results showed a mixed flora with prevalence of *Staphylococcus aureus*. The average duration of the treatment period was 67 days. The average interval between dressing changes was 4.1 days. Subsequent bacterial cultures showed a persistence of the original flora, but there was no correlation between the type of flora present and clinical evidence of infection or between the type of flora present and the rate of healing of the ulcer [1].

In another study, the bacterial flora of chronic venous ulcers treated with an occlusive hydrocolloid dressing were studied over eight weeks. The flora was generally stable. Once a species was present, it remained with the exception of *Pseudomonas*, which appeared to be inhibited by the dressing. Twelve out of 20 ulcers contained anaerobic bacteria and healing did not appear to be impaired by the presence of any particular species of bacteria [2].

Reference 1: Annoni F., Rosina M., Chiurazzi D., Ceva M., The effects of a hydrocolloid dressing on bacterial growth and the healing process of leg ulcers. Int Angiol 1989 Oct;8(4):224-228

Reference 2: Gilchrist B., Reed C., The bacteriology of chronic venous ulcers treated with occlusive hydrocolloid dressings. Br J Dermatol 1989 Sep;121(3):337-344

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Useful Resources

- A comparative study of the properties of twelve hydrocolloid dressings

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